

COUNTER-IMPROVISED EXPLOSIVE DEVICE FUSION CELLS AND THE BRIGADE COMBAT TEAM: A MODERN DAY IMPERATIVE

A Monograph

by

MAJ Benjamin A. Bennett, Ph.D.
United States Army



School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

2013-02

REPORT DOCUMENTATION PAGE				<i>Form Approved OMB No. 0704-0188</i>
<p>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>				
1. REPORT DATE (DD-MM-YYYY) 10-12-2013	2. REPORT TYPE SAMS Monograph	3. DATES COVERED (From - To) JAN 2013-DEC 2013		
4. TITLE AND SUBTITLE COUNTER-IMPROVISED EXPLOSIVE DEVICE FUSION CELLS AND THE BRIGADE COMBAT TEAM: A MODERN DAY IMPERATIVE			5a. CONTRACT NUMBER	5b. GRANT NUMBER
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Major Benjamin A. Bennett, Ph.D.			5d. PROJECT NUMBER	5e. TASK NUMBER
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) School for Advanced Military Studies 320 Gibson Avenue <u>Fort Leavenworth, KS 66027-2301</u>			8. PERFORMING ORG REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301			10. SPONSOR/MONITOR'S ACRONYM(S)	11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution is Unlimited				
13. SUPPLEMENTARY NOTES The Improvised Explosive Device (IED) has been responsible for more deaths and injuries than any other weapons system in both Iraq and Afghanistan. Despite a \$58 billion dollar investment in Counter-IED (C-IED) capability, the Department of Defense has been unable to prevent this weapon from achieving devastating effects on military and civilian targets and threatening national objectives. Within the Army, continued organizational refinements to fighting formations combined with formalization of specific capabilities will better prepare Army units for operations in high intensity IED environments. Specifically, the creation of an organic Brigade Combat Team C-IED Fusion Cell, sufficiently manned and singularly responsible for the integration and synchronization of all C-IED initiatives, will significantly improve targeting activities within the Brigade Combat Team and enable a more offensive posture when confronted with active IED threats. The IED environment has proven too complex and too lethal not to have a sufficiently manned and dedicated staff element assigned primary responsibility for integrating C-IED information and synchronizing C-IED activities.				
15. SUBJECT TERMS Counter-Improvised Explosive Device, C-IED, Fusion Cell, Brigade Combat Team, BCT, Improvised Explosive Device, Targeting, Network				
16. SECURITY CLASSIFICATION OF: Unclassified		17. LIMITATION OF ABSTRACT Unlimited	18. NUMBER OF PAGES 44	19a. NAME OF RESPONSIBLE PERSON
a. REPORT (U)	b. ABSTRACT (U)	c. THIS PAGE (U)		19b. PHONE NUMBER (include area code)

MONOGRAPH APPROVAL PAGE

Name of Candidate: Major Benjamin A. Bennett, Ph.D.

Monograph Title: Counter-Improvised Explosive Device Fusion Cells and the Brigade Combat Team: A Modern Day Imperative

Approved by:

_____, Monograph Director
Peter J. Schifferle, Ph.D.

_____, Seminar Leader
Juan K. Ulloa, COL

_____, Director, School of Advanced Military Studies
Henry A. Arnold III, COL

Accepted this 10th day of December 2013 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

COUNTER-IED FUSION CELLS AND THE BRIGADE COMBAT TEAM: A MODERN DAY IMPERATIVE by MAJ Benjamin A. Bennett, Ph.D., United States Army, 44 pages.

The Improvised Explosive Device (IED) has been responsible for more deaths and injuries than any other weapons system in both Iraq and Afghanistan. Despite a \$58 billion dollar investment in C-IED capability, the Department of Defense has been unable to prevent this weapon from achieving devastating effects on military and civilian targets and threatening national objectives. Within the Army, continued organizational refinements to fighting formations combined with formalization of specific capabilities will better prepare Army units for operations in high intensity IED environments. Specifically, the creation of an organic Brigade Combat Team Counter-IED Fusion Cell, sufficiently manned and singularly responsible for the integration and synchronization of all Counter-IED (C-IED) initiatives, will significantly improve targeting activities within the BCT and enable a more offensive posture when confronted with active IED threats.

The IED environment has proven too complex and too lethal not to have a sufficiently manned and dedicated staff element assigned primary responsibility for integrating C-IED information and synchronizing C-IED activities. The U.S. Army's experience with the IED in Iraq and Afghanistan, and the associated institutional response, demonstrate how unprepared the DOD was for the tactical and strategic impact of the IED. This analysis highlights how the defense establishment transformed from an organization which was unprepared for the emergence of this asymmetric threat to an institution rapidly and aggressively seeking ways to mitigate IED effectiveness. Trends relating to the continued global proliferation of IED technology and the affinity insurgents, guerrillas, terrorists, and criminals have with the IED are included to highlight the permanency of this threat and explain why military leaders should anticipate and prepare for continued exposure to the IED in future conflicts. Analysis of how BCTs approach integrating C-IED specific information and synchronizing C-IED activities will emphasize the need for a staff capability within the BCT dedicated to the analysis and synchronization of the IED fight. Fusion Cells are a proven concept, perfectly suited for integrating information and synchronizing activities against complex threats. Fusion Cells have been used successfully on multiple occasions in both Iraq and Afghanistan to attack complex networks and defeat IED threats. Furthermore, C-IED Fusion Cells are recognized in military doctrine as a necessity, at multiple echelons, when operating in high intensity IED environments.

The Army should make C-IED Fusion Cells a resident capability within each BCT. Continued investments in capability within warfighting formations, singularly focused on the holistic defeat of the IED, will greatly enhance a BCT's ability to operate in the IED threat domain. The Army should continue to actively seek opportunity to improve methods, materials, organizations, and procedures, designed to help prevent and mitigate IED attacks. The addition of a C-IED Fusion Cell within each BCT provides a prime opportunity.

TABLE OF CONTENTS

INTRODUCTION	1
HISTORICAL PERSPECTIVE	4
The Iraq Experience.....	5
Organizational Response	8
Equipping Response	10
Training Response.....	12
THE IED IN FUTURE CONFLICTS	13
Insurgent, Terrorist, and Guerrilla	15
C-IED Trends Within the BCT	18
The Staff Centric Approach	19
The Targeting Process	23
BSTB Centric Approach	22
C-IED FUSION CELLS.....	24
Example of Fusion Cell Success.....	26
Doctrinal Recognition of C-IED Fusion Cell Requirements	30
Implementation Considerations and Recommendations.....	32
CONCLUSION	36
BIBLIOGRAPHY	39

INTRODUCTION

The United States military's intense frustration with the Improvised Explosive Device (IED) in Iraq and Afghanistan has served to reinforce the recognition that the IED is a weapon with diverse tactical applications capable of achieving strategic effects. The world has witnessed how IEDs, when employed effectively, are capable of challenging technical superiority, tactical dominance, national objectives, and American will. An IED is cheap, often constructed with readily available commercial materials, and its lethality is limited only by the imagination of the creator. Despite a \$58 billion investment in technology, intense focus from the military, industry, academia, and the creation of joint and service specific Counter-IED (C-IED) headquarters, the IED remains the largest casualty producing weapon in both Iraq and Afghanistan.¹ The IED has been responsible for over 3,200 American deaths and 33,000 American injuries in both Iraq and Afghanistan and is predicted by the Department of Defense (DOD) to be a principle weapon in any future conflict.² As such, the President of the United States, the Chairman of the Joint Chiefs of Staff, and the Headquarters of the Army have all directed a continued investment of monetary and intellectual resources in an attempt to better enable the targeting and defeat of both IED networks and devices.³

¹U.S. Government Accountability Office, *Counter-Improvised Explosive Devices: Multiple DOD Organizations are Developing Numerous Initiatives* (Washington, DC: Government Printing Office, 2012), 1.

²Michael D. Barbero, LTG, Director of Joint IED Defeat Organization, "War Against Terrorists' IED Will Be With Us Forever," *Stars and Stripes*, 20 May 2013, <http://www.stripes.com/war-against-ieds-will-be-with-us-forever-1.221692> (accessed 30 May 2013); U.S. Government Accountability Office, *Counter-Improvised Explosive Devices: Multiple DOD Organizations are Developing Numerous Initiative* (Washington, DC: Government Printing Office, 2012), 1.

³Department of the Army, *2012 Army Strategic Planning Guidance*. (Washington, DC: Government Printing Office, 2012); Department of Defense, Joint IED Defeat Organization, *Counter Improvised Explosive Device Strategic Plan 2012-2016* (Washington, DC: Government Printing Office, 2012); The White House. *Countering Improvised Explosive Devices* (Washington, DC: Government Printing Office, 2013); Department of Defense 2013 Budget

Over the past decade, the United States Military has made significant progress mitigating the effects of the IED. Organizational, technical, and tactical developments have improved the military's ability to operate on the IED battlefield. Technology has better enabled ground formations to detect IEDs before a blast occurs, and thanks to improvements and rapid fielding of blast resistant vehicles, Soldiers, Sailors, Airman, and Marines are more likely to survive a blast today than they were in 2003. Additionally, experience, technology and organizational adaptation has enabled more productive targeting of both the device and the network. Although much has been accomplished, there is still room for improvement.

Within the Army, continued organizational refinements to fighting formations combined with formalization of specific capabilities will better prepare Army units for operations in high intensity IED environments. Specifically, the creation of an organic Brigade Combat Team (BCT) Counter-IED Fusion Cell, sufficiently manned and singularly responsible for the integration and synchronization of all Counter-IED (C-IED) initiatives, will significantly improve targeting activities within the BCT and enable a more offensive posture when confronted with active IED threats. This improvement will increase battlefield survivability for American soldiers and enhance a BCT's ability to accomplish assigned tasks. BCTs will face IEDs in future conflicts and the IED environment has proven to be too complex and too lethal not to have a dedicated staff element assigned primary responsibility for integrating C-IED information and synchronizing C-IED activities. C-IED Fusion Cells are a proven solution and a recognized necessity in high intensity IED environments and need to be a resident capability within each Army BCT.

Request (Washington, DC: Government Printing Office, 2013) In the 2013 Budget the Department of Defense requested 1.7 Billion dollars be allocated as a specific line item towards IED defeat.

The support for this assertion is provided through the following three part analysis. First, an overview of American involvement with the IED during operations in Iraq and Afghanistan will provide an historical baseline and demonstrate how C-IED operations have evolved. This overview demonstrates that the DOD was relatively unprepared for the tactical and strategic significance of the IED in these two conflicts. This placed American forces at a distinct disadvantage and required a significant and unanticipated expenditure of resources to overcome.

Second, the U.S. Military can expect continued exposure to the IED in future conflicts. Global proliferation of IED technology and expertise is evident through the exponential increase in IED attacks around the world. Lessons from Iraq, Afghanistan, and around the world, have highlighted the affinity criminals, terrorists, guerillas, and insurgents place on the IED. Despite twelve years of exposure, many BCTs continue to be challenged with how to best organize and operate within high threat IED environments. Examination of several organizational techniques used by BCTs in their battle to defeat IED networks, and the associated difficulties, highlight the challenges many BCTs experience.

Part three of this monograph focuses on how Fusion Cells have been employed in a similar capacity as a means of integrating information, synchronizing activities, and solving complex problems. These case studies are provided to confirm the legitimacy of the Fusion Cell concept. Additionally, recent recognition of the need for C-IED Fusion Cells within DOD doctrinal publications, highlights the merit of this recommendation. Lastly, considerations associated with the composition and disposition of a BCT C-IED Fusion Cell as well as details specific to implementation are provided for use by those considering execution of this recommendation.

Although great progress is being made, the U.S. military cannot afford to risk being unprepared for the IED threat in future conflicts. Military leadership should continue their efforts

to actively seek opportunities to improve the BCTs ability to operate in high intensity IED environments. C-IED Fusion Cells provide this opportunity.

HISTORICAL PERSPECTIVE

Although America's involvement in Iraq and Afghanistan has made the IED a dominant topic in military circles; their presence has been witnessed on battlefields around the world over the last seven centuries of conflict. Ever since the advent of gunpowder in approximately 850 AD militaries have been experimenting with new and creative ways to focus devastating explosive effects against adversaries.⁴ There are Chinese drawings and text dating back to 1350 which outline the use of explosive devices, constructed to detonate when disturbed by a trespassing individual.⁵ There are multiple records from around Europe which indicate Spanish, English and Polish use of IEDs in the 1500s.⁶ In the U.S. Civil War there was repeated use of jury-rigged bombs and mines. Landmines were used extensively in World War I and the idea of using explosively formed penetrators, capable of piercing armor plating on vehicles dates back to World War II.⁷ Furthermore, in both Vietnam and Northern Ireland opposition forces repeatedly used booby-traps, land mines, and IEDs against U.S., British, and Australian forces.⁸

In more recent history, terrorist groups have continued to refine the destructive capacity of improvised explosives. The Liberation Tigers of Tamil Eelam (LTTE) in Sri Lanka, a terrorist organization which at the time many considered as the most dangerous in the world, used IEDs

⁴Roger Davies, "Early Chinese Victim-Operated IEDs," www.standingwellback.com/home/2012/6/10/early-chinese-victim-operated-ieds.html (accessed 30 May 2013).

⁵Ibid.

⁶Ibid.

⁷P. W. Singer, "The Evolution of the IED: Why Our Countermeasures Fail to Keep Up with the Growing Threat," *Armed Forces Journal* (February 2012), <http://wwwarmedforcesjournal.com/2012/01/8565673/> (accessed on 30 May 2013).

⁸Andres Smith, *Improvised Explosive Devices in Iraq, 2003-09: A Case of Operational Surprise and Institutional Response* (Strategic Studies Institute, U.S. Army War College, Carlisle, PA, 2011), 7.

extensively from 1980 to 2009. The Tigers, as they were formerly known, considered IEDs and suicide bombers a critical component of their insurgent campaign to gain an independent state in northern Sri Lanka.⁹ A signature weapon for the LTTE was an IED comprised of military-grade explosives and ball bearings. These along with other IEDs were far more lethal than anything used by jihadist terrorist groups in the Middle East during the same period. Modern day Islamic extremist terrorists groups such as al-Qaeda and Hezbollah learned much of about IED construction and employment from the Tigers.¹⁰

The Iraq Experience

Examination of professional journals and other forums for military discussion demonstrate that military thinkers recognized the significance of urbanization, non-state actors, technical dominance and contemplated how these and other variables would influence future conflicts. Military professionals expected future adversaries to seek an asymmetric advantage in order to negate technical and tactical dominance.¹¹ However, despite previous exposure to the IED, and anticipation of asymmetric threats, the U.S. military was unprepared for the existence or significance of the IED threat in Iraq and Afghanistan. A report by the DOD Inspector General stated:

DOD was unaware of the threat posed by mines and improvised explosive devices in low intensity conflicts and of the availability of mine-resistant vehicles years before insurgent actions began in Iraq in 2003.... As a result, the Department entered into

⁹Preeti Bhattacharji, “Liberation Tigers of Tamil Eelam (aka Tamil Tigers) (Sri Lanka, separatists),” *Council on Foreign Relations*, 20 May 2009; Kate Picket, “A Brief History of the Tamil Tigers,” *Time World* (4 Jan 2009).

¹⁰Mia Bloom, “What the Tigers Taught Al-Qaeda,” *Washington Post*, 24 May 2009, http://articles.washingtonpost.com/2009-05-24/opinions/36908404_1_female-suicide-bom (accessed 30 May 2013).

¹¹Ibid.

operations in Iraq without having taken available steps to acquire technology to mitigate the known mine and IED risk to soldiers and Marines.¹²

The Army initiated OPERATION ENDURING FREEDOM (OEF) and OPERATION IRAQI FREEDOM (OIF) generally ill-equipped for the challenges associated with what would become the insurgent's signature weapon.

In March 2003, the U.S. Army crossed Iraq's border with Kuwait heading north to Baghdad believing that the U.S. Army's main battle tank, the M1 Abrams, and the M2 Bradley Fighting Vehicle, were virtually indestructible, and when employed correctly, their occupants were relatively secure from the majority of hazards associated with ground combat. A year later, in 2004, the DOD was becoming rapidly aware of the depressing reality that for less than a hundred U.S. dollars, the cutting edge technology and devastating firepower of the M1 and the M2, their associated crews, and other soldiers on most vehicular platforms were vulnerable to the effects of an IED.¹³

The significance of the IED threat in Iraq becomes readily apparent through the analysis of IED incidents. In September of 2003, approximately six months after the initiation of combat operations, IED attacks in Iraq were averaging 100 per month.¹⁴ Roughly one year after the

¹²Smith, 9.

¹³Rick Atkinson, "Left of Boom," published as 4-Part Series, *Washington Post*, 30 September 2007, 1 October 2007, 2 October 2007, 3 October 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/09/29/AR2007092900751_pf (accessed 5 June 2013), 4, 15; Bennett, Benjamin A, "Development of a Methodology for Evaluating and Anticipating Improvised Explosive Device Threat Activity Using a Fault Tree Based Process" (Doctoral Dissertation, Clemson University, 2009), 5, 6; Brigadier General Votel, leader of the Counter IED Task Force is quoted in an April 2004 article in Army Magazine as stating that "with relatively small amount of resources-access to common electronic components and military ordinance and electronic and demolition skills insurgents can build devices that literally have the capability to destroy prominent conventional warfare systems like the Abrams Tank and Bradley Fighting Vehicle."

¹⁴Atkinson, 30 September 2007, 4.

initiation of hostilities, in February 2004, IED attacks in Iraq had risen to 100 per week. By the end of 2004 there had been approximately 5,600 IED events throughout the country. Three years after the invasion of Iraq there had been over 32,000 recorded IED attacks. In 2007, IED attacks averaged one every 15 minutes with a total of over 20,000 IED attacks in the first seven months of the year. Five and half years after the war in Iraq had started, there had been over 81,000 recorded IED attacks in Iraq alone.¹⁵ This exponential increase in activity can be attributed to a number of variables but is primarily indicative of the availability of materials and the insurgency's appreciation of the effectiveness of the IED.

The dramatic increases in overall numbers of IED attacks, and corresponding casualties, served as a wakeup call to the defense establishment as to the severity of the IED problem.¹⁶ Fortunately, once the senior leadership recognized the emergence of this lethal asymmetric advantage, and the associated tactical and strategic implications, they did not hesitate initiating an aggressive institutional response. Senior leaders worked diligently to implement meaningful solutions to mitigate IED effectiveness. In September 2003, the Army Chief of Operations, Lieutenant General Cody, recognizing the tactical and strategic implications of the IED, mandated the creation of a dedicated IED Task Force. A more formal request for a solution to the IED problem was provided in June of 2004, when during a testimony before Congress, General John Abazaid, the Commander of Central Command (CENTCOM), requested the creation of a "Manhattan Style Project" to address the IED problem.¹⁷ The nature and magnitude of the DOD's

¹⁵Atkinson, (1 October 2007) 3, (2 October 2007) 8, (3 October 2007) 1.

¹⁶Smith, 7.

¹⁷Atkinson, 1 October 2007, 4. "Manhattan Style Project" refers to the U.S. government initiative during World War II to develop the nuclear bomb. The government gathered the brightest scientific minds of the time and invested significant resources to fast track the bombs development.

response is illustrated through analysis of the organizational, equipping and training changes which occurred in response to the aforementioned IED activity.

Organizational Response

The IED Task Force created at the direction of Lieutenant General Cody originally consisted of roughly a dozen hand selected and retired special operations personnel. This initial task force operated in teams which were contracted to collect and disseminate C-IED Tactics Techniques and Procedures (TTPs) across units in theater. The first team of seven men was sent to Iraq in December 2003.¹⁸ Then Brigadier General Joseph Votel was selected to lead the small team, initially operating in a small office in the Pentagon on a \$20 million budget.¹⁹ In July 2004, the IED Task Force became a joint organization with support from all services and reported directly to the Assistant Secretary of Defense, Mr. Paul Wolfowitz. At this time their budget also increased from \$20 million to a \$100 million. In June 2005, the IED Task Force transformed into the Joint IED Defeat Task Force and again received a budget increase to \$1.3 billion.²⁰ A retired Four Star General, General Montgomery Miggs, was asked to lead the organization. The evolution of the IED Task Force brought with it an expanded charter. From initially focusing collecting and disseminating tactically relevant information, the task force rapidly became responsible for developing more comprehensive and sustainable C-IED solutions.²¹

In January 2006, the Joint IED Defeat Task Force transformed again to what it is formally named today, the Joint IED Defeat Organization (JIEDDO). JIEDDO is the DOD's primary proponent for all C-IED activities. JIEDDO's mission is to "lead DOD actions to rapidly

¹⁸Atkinson. 30 September 2007, 7.

¹⁹Ibid, 6-7.

²⁰Atkinson, 30 September 2007, 10; Smith.

²¹Atkinson, 30 September 2007, 7-10.

provide C-IED capabilities and solutions in support of Combatant Commanders, the Services, and as authorized, other federal agencies to enable the defeat of the IED as a weapon of strategic influence.”²² An Army Lieutenant General directs JIEDDO and is responsible for overseeing the activities associated with its three established lines of operations: (1) attack the network, (2) defeat the device, and (3) train the force.²³

Further organizational advancements took place within Explosive Ordnance Disposal (EOD) and Combat Engineer formations. The EOD community initiated OEF and OIF operating under an antiquated cold-war service support construct. In the early days of OIF and OEF, maneuver and EOD formation were unaccustomed to working together. EOD assets were employed using a “wait-and-see” approach, remaining in the rear area until their specific capability was required. Moreover, the number of EOD forces within the Army, and deployed to Iraq, was drastically insufficient for the developing threat.²⁴ The Army responded by significantly increasing EOD end strength while simultaneously creating two theater C-IED task forces. These task forces were Combined Joint Task Force (CJTF) Troy in Iraq and CJTF Paladin in Afghanistan. CJTF Troy and CJTF Paladin were created as brigade level equivalents designed to advise corps and theater commanders on C-IED operations and serve as the parent headquarters for all EOD forces in theater. These headquarters were responsible for conducting a multitude of C-IED activities to include serving as an advisor the CJTF Commander on IED threats, forensic and intelligence analysis, equipment testing and fielding, distribution and supervision of EOD assets, and Tactics Techniques and Procedure (TTP) distribution. The DOD also created and

²²Department of Defense, Joint IED Defeat Organization, *Counter Improvised Explosive Device Strategic Plan 2012-2016* (Washington, DC: Government Printing Office, 2012), 1.

²³Ibid., iii.

²⁴Christopher Riemer, “The Organizational Implications of the U.S. Army’s Increasing Demand for Explosive Ordnance Disposal Capabilities” (Master’s thesis, Command and General Staff College, 2008; Atkinson, 30 September 2007, 1-5.

deployed additional EOD battalions. Their mission was similar to CJTF Paladin and CJTF Troy, namely serving as division level EOD battalions, advising division commanders on C-IED initiatives, and serving as the higher headquarters for all EOD assets operating within a division's battle space.²⁵

The US Army Engineer Regiment also responded with several initiatives. Engineer leadership sponsored the fielding of Route Clearance Patrols, manned trained and equipped specifically to facilitate IED detection and reduction, and better enable assured mobility. Courses such as Route Reconnaissance Clearance Course (R2C2) and Explosive Ordnance Clearance Agent (EOCA) were developed and refined to provide maneuver commanders with an additional IED reduction and C-IED capability. In 2004, the Engineer Regiment transformed the Mine/Counter Booby-Trap center into the Counter Explosive Hazards Center. This organization was specifically modified to address the IED threat.²⁶ Additionally, in June of this year, the Army announced that it will create Brigade Engineer Battalions (BEB) within each BCT. Each BEB will have a traditional Combat Engineer Company (often trained to do IED reduction) and a Route Clearance Company. This addition will significantly enhance a BCT's ability to locate and reduce IEDs with organic assets.²⁷

Equipping Response

U.S. forces initiated combat operations in Afghanistan and Iraq with a limited assortment of C-IED specific equipment. Initially in Iraq, the primary mode of transportation was the un-

²⁵Vincent T. Clark, “The Future of JIEDDO--The Global C-IED Synchronizer” (Special Report, Naval War College, 2008), 2, 7.

²⁶Smith, 16, 23.

²⁷ Michelle Tan, “Army Proposes Adding Engineers to Brigades”, *Army Times*, 12 May 2012, <http://www.armytimes.com/article/20120512/NEWS/205120320/Army-proposes-adding-engineers-to-brigades> (accessed 29 October 13); Todd Lopez, “Combat Teams Cut at 10 Posts Will Help other BCTs Grow,” (25 June 2013), http://www.army.mil/article/106373/Brigade_Combat_Team_cut_at_10_Posts_will_help_other_BCTs_grow/, (accessed 27 September 13);

armored High Mobility Multi Wheeled Vehicles (HMMWVs) with only 235 up-armored variants available in the entire country.²⁸ Due to a limited number of robots, the Army's few hundred EOD technicians were forced to wear heavy and cumbersome bomb resistant suites and physically approach suspected IEDs. In September of 2003, an EOD technician was killed while trying to manually disarm a radio controlled IED. Within hours of his death, EOD forces in theater were ordered to immediately inventory and consolidate all EOD robots. The inventory revealed that there were only 18 EOD robots in all of Iraq, of which six were operational. Ground based electronic countermeasures were limited to an antiquated system called the Citadel, designed to create a small safe zone around EOD technicians. Furthermore, it was not until June 2003 that the DOD decided to equip all military personnel in theater with the modern Interceptor Body Armor which is capable of providing basic level of protection against small explosive threats.²⁹

In response to these and other identified equipment shortcomings the DOD began to aggressively pursue material solutions. By July 2005 initial request for armor modifications to the HMMWV fleet was complete with 9,727 up-armored HMMWVs in Iraq. Unfortunately, through the natural action-reaction evolution of the IED battlefield, insurgents began to modify IEDs focusing on vulnerabilities inherent to up-armored HMMWVs, rendering them insufficient. This evolution led to the initiation of the Mine Resistant Ambush Protected (MRAP) vehicle program in November 2006, and a corresponding request for over 25,000 vehicles for both Iraq and Afghanistan.³⁰ Simultaneously, additional detection and protection capabilities were developed and fielded.

²⁸Atkinson, 30 September 2007, 5.

²⁹Atkinson, 30 September 2007, 1-7.

³⁰Smith, 18.

During the summer of 2004, the military and industry were aggressively searching for improved surveillance and electronic warfare solutions. This early period would see the development, testing and employment of satellites, U-2 reconnaissance aircraft, blimps with cameras, Mako, Warrior Alpha, Desert Owl, I-Gnat, and Copperhead unmanned aerial vehicles, as well as Horned Owl and Constant Hawk turboprop airplanes specifically employed as surveillance assets to detect IED activities.³¹ To address the radio-controlled threat, multiple variations of Counter Radio Controlled IED Electronic Warfare (CREW) systems were rapidly developed and fielded. These systems were intended to mitigate insurgent's use of radio signals as a method of detonating IEDs. These CREW systems include the Citadel, Warlock Red, Warlock Green, Self-Screening Vehicle Jammer, IED Counter Electronic Device (ICE), Duke, Guardian, Hunter, Spirals, and Chameleon.³²

Training Response

Along with organizational and equipment improvements, the need for improved C-IED training was quickly recognized. By the end of 2003, units were actively collecting and disseminating IED specific TTPs. The Mine and Explosive Hazard Information Coordination Center (MEOICC) developed Explosive Hazard Awareness Teams (EHAT) as a result of the increasing IED activity. These teams became responsible for collecting and disseminating IED specific information.³³ In early 2004 this information, along with data from other organizations, served as the foundation for mandatory home station pre-deployment training. IED specific training lanes were developed and integrated into the normal Reception Staging, Onward

³¹Department of Defense, Joint IED Defeat Organization, *Rapidly Providing Capabilities to the Warfighter*, <https://www.jieddo.mil/accomp.aspx> (accessed 2 May 2013); Atkinson.

³²Atkinson, 30 September 2007, 1-10; Smith, Andres, 21; Department of Defense, *Providing Capabilities to the Warfighter*.

³³Smith, 22. The MEOCC was an existing engineer centric organization that deployed with the corps staff in order to track explosive hazards as a normal part of combat operations.

Movement, and Integration (RSOI) process.³⁴ Additionally, IED training scenarios were integrated into unit certification exercises at military training centers. Development of Joint Centers of Excellence, Knowledge Information Fusion Centers, C-IED Mobile Assistance Training Teams, C-IED live fires, formalization of IED battle drills, tactical site exploitation, and Mobile C-IED Interactive Trainers were all DOD training initiatives undertaken with the goal of better preparing the force for its certain encounter with IEDs.³⁵

To date the DOD has invested over \$58 billion developing, acquiring, and fielding organizational, equipment, and training solutions designed to address the lethal nature of the IED environment and better position U.S. forces to prevent, detect, and survive IED detonations.³⁶ Since its inception, JIEDDO itself has fielded over 63 separate initiatives designed to improve the war-fighter's ability to attack the network, defeat the device, and train the force.³⁷ Despite these investments, the IED continues to be a persistent battlefield threat, and is predicted to remain so in future conflicts.³⁸

THE IED IN FUTURE CONFLICTS

Despite the efforts listed above to reduce effectiveness and prevent proliferation, IED attacks on other battlefields has also increased significantly. From January 2011 to November 2011, not including events in Iraq and Afghanistan, there were over 6,800 IED attacks around the world. These attacks caused over 12,000 casualties, in 111 different countries, and were executed

³⁴Smith, 22, 23.

³⁵Department of Defense, *Rapidly Providing Capabilities to the Warfighter*.

³⁶U.S. Government Accountability Office, *Counter-Improvised Explosive Devices*, 1.

³⁷Department of Defense, *Rapidly Providing Capabilities to the Warfighter*.

³⁸U.S. Government Accountability Office, *Counter-Improvised Explosive Devices*. This report, published in 2012 provides details specific to the C-IED initiatives indicating that from 2008 to 2011 there were 1,340 separate initiatives being developed by 45 separate agencies. The report helps to illustrate the complexity of the IED environment and clearly articulates that the IED will likely be a “mainstay” in any future conflict.

by 40 separate regional and transnational threat networks. Of these attacks, 490 IED attacks took place within the United States.³⁹ On 15 April 2013, a terrorist attack occurred at the finishing line of the Boston Marathon killing three people and injuring 260.⁴⁰ These statistics support the recognition by senior government and military officials that the IED is a global reality and America's exposure to IEDs will endure long after the United States' involvement in Iraq and Afghanistan. The former director of JIEDDO, LTG Michael Barbero, stated in JIEDDO's 2012-2016 strategic plan that "the IED is the weapon of choice for the overlapping consortium of networks operating along the entire threat continuum- criminal, insurgent and terrorist alike."⁴¹ Criminals, terrorists, and future enemies of the United States have recognized the strategic influence of the IED.

Facing the prospect of defeat against a numerically, militarily, or industrially superior opponent, the use of IEDs by relatively inferior forces should come as no surprise. From the perspective of the outnumbered, outgunned, and ill-equipped, the decision to employ IEDs is logical because they are cheap, flexible, and highly effective weapons. They provide a pragmatic guerrilla, insurgent or terrorist, or so called freedom fighter with a weapon capable of striking a punishing blow against their enemy's combat advantage.⁴²

Adversaries of the United States will continue to use IEDs in future conflicts because they are an efficient means of accomplishing political, tactical, and strategic objectives. A 2013 White House policy memo on *Countering Improvised Explosive Devices* states that the IED remains the most

³⁹Department of Defense, *Counter Improvised Explosive Device Strategic Plan 2012-2016*, 2.

⁴⁰"Thousands Run Final Mile of Boston Marathon," *USA Today*, 25 May 2013, <https://www.usatoday.com/story/sports/olympics/2013/05/25/thousands-run-final-mile-boston-marathon> (accessed 19 June 2013).

⁴¹Department of Defense, *Counter Improvised Explosive Device Strategic Plan 2012-2016*, 2.

⁴²James Kennedy Martin, "Dragon's Claws: The Improvised Explosive Device (IED) as a Weapon of Strategic Influence" (Master's thesis, Naval Postgraduate School, 2009). Original source is from Evan Colbert, "The Devil's Right Hand: Understanding IEDs and Exploring Their Use in Armed Conflict," 50.

effective and available weapon to the terrorist or criminal seeking to damage infrastructure and inflict casualties. The memo also predicts that IED tactics and the sophistication associated with IED attacks will continue to evolve as adversaries seek to overcome IED countermeasures.⁴³

America's involvement in Iraq has demonstrated to the world that the IED can allow the unseen enemy to deliver devastating destruction and inflict significant casualties against better trained, better equipped, and technologically advanced military. The IED allows the enemy to pick the times and place of their choosing, provides a significant propaganda tool, and can effect changes of strategy and policy of nation states.⁴⁴ As such, the IED is the perfect weapon for the insurgent, terrorist, and guerrilla. To further appreciate the role of the IED in future conflicts and the affinity of the IED by terrorists, guerillas, and insurgents, it important to understand how the IED supports the accomplishment of their objectives.

Insurgent, Terrorist, and Guerrilla

The terms Insurgent, Terrorist, and Guerrilla each have distinct meanings worthy of discussion. The U.S. Military defines an insurgency as “organizational movement aimed at the overthrow of a constituted government through use of subversion and armed conflict.”⁴⁵ Terrorism on the other hand, is defined by many analysts as “the threat or use of physical coercion against non-combatants to create fear in order to achieve political objectives.” “Guerrilla warfare, by contrast, consists of hit-and-run attacks against police and military and the physical infrastructure that supports them.”⁴⁶ Insurgencies often use both terrorist and guerrilla tactics to

⁴³The White House, 2

⁴⁴Martin, 4.

⁴⁵Martin, 16; Original source Department of Defense, JP 1-02, *Dictionary of Military and Associated Terms* (Washington, DC: U.S. Government Printing Office ,12 April 2001), 268.

⁴⁶Benjamin A. Bennett, “Development of a Methodology for Evaluating and Anticipating Improvised Explosive Device Threat Activity Using a Fault Tree Based Process” (Doctoral

achieve specific objectives. For purpose of this discussion all three terms are collectively described as insurgents.

Insurgents use violence in a calculated way intended to achieve specific results. Insurgent violence is not random; it is used deliberately to achieve specific short and long term results.⁴⁷ To achieve their goals insurgents effectively distinguish between two separate sets of targets. These two distinct target sets include: the “target of attack” and “target of influence.” The “target of attack” is physical entity being destroyed or damaged by the IED. The “target of attack” is used to direct a broader message to the target of influence. Successful manipulation of both target sets ultimately leads to a behavior change. This behavior change is the ultimate objective of the insurgent.⁴⁸

The IED is ideally suited for integration into this approach. The IED is effective because it allows the insurgent not only do physical damage but also capitalize on the psychological and informational aspect of warfare. The IED enables the insurgent to demonstrate power and capability while simultaneously sending a message to the state and the populace. It enhances the perception that the military and the state control neither the terrain nor the population.⁴⁹ The IED allows the insurgent to frustrate the military force while simultaneously, through the use of media, contributing to the erosion of political support for the conflict and the population’s expectation for conflict termination.⁵⁰

An IED strikes unexpectedly like the piercing crack of a sniper rifle. The sense of urgency felt on the battlefield or in the amputee wards enters living rooms via nightly

Dissertation, Clemson University, 2009); Original source R. Taber, *War of the Flea* (Virginia: Potomac Books Inc., 2002), ix.

⁴⁷Martin, 19; original source O'Neill, *Insurgency & Terrorism: From Revolution to Apocalypse*, 36.

⁴⁸Martin, 24, 25.

⁴⁹Martin, 6.

⁵⁰Martin, 7, 36.

news coverage. Images of IED attacks invoke strategic influence over the public, a public otherwise physically dislocated from combat....The strategic power of the IED comes from a non-kinetic source, information.⁵¹

The current Chief of Staff of the Army General Raymond Odierno states that the Army must be prepared to conduct a wide variety of missions against complex opponents in diverse terrain. The missions include counter-insurgency, counter-terrorism, irregular warfare, counter weapons of mass destruction, as well as defense of the homeland and support to civil authorities.⁵² The IED has been repeatedly used in all of these environments. If history serves as an example, it is reasonable to expect that these mission sets will involve aggressive use of, and repeated exposure to the IED threat.

The Army must continue to search for ways to increase its preparedness for the IED environment. The IED environment is constantly evolving and technical solutions have a limited shelf life. In the IED environment, once a friendly force achieves a technological advantage, the enemy develops new methods to circumnavigate or offset the advantage. The US defense establishment has recognized that there is no “silver bullet” solution to the IED problem. “Defense planners should view the IED like medical professionals view the influenza virus, another “primitive”, adaptable and lethal enemy. As soon as vaccines have defeated a certain flu strain, the virus evolves.”⁵³ Despite the significant advancement in the military’s C-IED posture, there is still room for improvement. More specifically, the Army should take steps to improve the

⁵¹Martin, 40; Original source, William G. Adamson, “An Asymmetric threat invokes strategic leader initiative: the Joint Improvised Explosive Device Defeat Organization” (Seminar Paper, The Industrial College of the Armed Forces National Defense University, Fort McNair, Washington, D.C., 2007).

⁵²Department of the Army, *2012 Army Strategic Planning Guidance*.

⁵³Benjamin A. Bennett, “Development of a Methodology;” Original source, Haninah Levine, “Improvised Response; Combating IEDs Will Require an Agile Game of Action and Reaction,” *Bulletin of Atomic Scientist*, July/Aug. 2006: 22-23.

ability of BCT to effectively operate in high intensity IED environments. This can be achieved in part by manning the BCT staff with the requisite expertise and in sufficient numbers to focus solely on the integration and synchronization of all aspects of the C-IED fight. Currently there is no organic staff section within the BCT headquarters strictly focused on these activities. This is a proven and recognized solution and will help alleviate many of the challenges BCTs face operating in aggressive IED environments.

C-IED Trends Within the BCT

Army BCTs continue to search for the most efficient manner in which to organize for high threat IED environments. Iraq and Afghanistan has demonstrated that IED events can occur against all kinds of forces, in all kinds of terrain, and at all times of day. BCTs realize that IEDs are a persistent hazard and C-IED activities must be integrated into every operation. To maximize effectiveness, a BCT needs to be able to analyze, coordinate, and synchronize all types of C-IED intelligence and capabilities. The complexity of the IED environment combined with the enormous amount of C-IED specific information and assets available to a BCT necessitates the need for a dedicated element to maintain visibility, ensure effective analysis, and ensure proper synchronization.

BCTs typically use one of three general approaches for organizing and synchronizing the CIED fight. One approach assigns primary responsibility to a member of the BCT staff (generally the BCT Intelligence Officer, the BCT Operations Officer, or BCT Engineer). The second common technique is to assign primary responsibility to the Brigade Special Troops Battalion (BSTB). Third, many BCTs use their standard counter insurgency targeting process as the primary venue for fusing IED specific intelligence and synchronizing C-IED activities.⁵⁴ On the

⁵⁴Joint Readiness Training Center Observer Controller/Trainer Mentors. Lieutenant Colonel Kevin Brown, Brigade Special Troop Battalion Lead Observer Controller/Trainer Mentor

surface, these seem like logical approaches to C-IED operations. The modern BCT has robust Intelligence and Operations sections, and it is logical to believe that the existing structure is sufficient to address the IED threat. Other BCTs believe that because a BSTB is the organic headquarters of the Route Clearance Company, administratively responsible for allocated EOD assets, then C-IED operations is a natural mission for the BSTB headquarters. In most cases however, these three techniques fail to maximize the intelligence integration and asset synchronization which can be achieved by an independent entity, with a singular focus on the complexity of the IED environment. The common deficiencies of each general approach are provided under the general description of the Staff Centric Approach, the BSTB Centric Approach, and the Targeting Approach.

The Staff Centric Approach

The BCT Intelligence Section (S-2) is responsible for integrating an enormous amount of information concerning a multitude of threats from numerous sources and agencies operating throughout the environment. This intelligence comes from diverse sources, provided from multiple platforms, focused on entities engaging in a multitude of nefarious activities. In itself, this is a daunting and all consuming task. The complexities associated with the IED environment make thorough identification, analysis, and dissemination of all available IED specific data even more cumbersome and serve to highlight why a dedicated element is recommended. JIEDDO's organization responsible for fusing and integrating C-IED intelligence and operations, namely the Counter-IED Operations/Integration Center (COIC), has identified over 30 separate independent

(telephone interview 15 August 2013) and Major Marcus Bynum, Senior Brigade Engineer Observer Controller/Trainer Mentor and C-IED Lead for the Brigade Mission Command Lead at the Joint Readiness Training Center. Combined they have observed and evaluated 36 Brigade Combat Teams rotations and evaluated their C-IED techniques and procedures.

agencies capable of providing C-IED relevant information.⁵⁵ Compound those 30 organizations with theater and BCT specific assets and one can appreciate the vast amount of C-IED relevant intelligence available to a BCT. Effectively integrating all of this capability requires a dedicated element intimately familiar with C-IED operations. Although some BCT S-2 sections are capable of analyzing and integrating this large amount of threat specific data, many understandably fail to synthesize all available information.⁵⁶

Offensive C-IED activities require a comprehensive understanding of the IED environment. Anticipating where the next attack will occur, analysis of supply chain activities, juxtaposing technical specifications of a device, prediction models, and technical nuances of specific ISR platforms enables a more offensive posture. This level of analysis usually occurs only when both intelligence and operational specialists analyze the entire IED environment collectively. When a unit assigns primary responsibility for the C-IED fight to its S-2 personnel, they are often unable to integrate all information at their disposal. Or if the unit is able to effectively analyze the information, it will often fail to thoroughly synchronize offensive activities, in time, space, and purpose, to maximize C-IED effectiveness. This is not a matter of incompetence; it is directly related to the complexity of the environment and the comprehensive approach that must be taken.⁵⁷

Precise planning and execution of ISR activities allows for a better understanding of the complexity associated with C-IED activities. There are many different types of C-IED specific ISR platforms in operation today. Each platform is designed and allocated to exploit specific

⁵⁵Counter-IED Operations/Integration Center, “Joint IED Defeat Organization,” <https://jieddo.mil/attack.aspx> (accessed 6 Aug 2013).

⁵⁶Joint Readiness Training Center Observer Controller/Trainer Mentors. Collective observations over 36 separate BCT rotations.

⁵⁷Ibid.

aspect of the IED environment.⁵⁸ Platforms are designed to detect different aspects of the material collection, device construction, device emplacement, or detonation phase of the IED life cycle. This does not include other related activities such as Engineer Route Clearance Patrols (RCP) and Presence Patrols which, when synchronized with a detailed C-IED ISR plan can achieve synergistic effects.⁵⁹ Positioning the right asset, at the right time, and at the correct location, to detect and exploit, specific IED network activity, requires technical expertise, comprehensive analysis, and dedicated attention to detailed aspects of the IED environment. Most BCT S-2 sections are not sufficiently manned with the requisite expertise to perform this level of dedicated and focused analysis against a single aspect of the environment.

Another common trend is to assign primary responsibility to the BCT Operations Officer (BCT S-3) who often delegates responsibility to the BCT Engineer. For reasons similar to that of the BCT S-2 approach, this approach often fails to achieve a complete synthesis of information and synchronization of assets. Much like the BCT S-2 section, the BCT S-3 and BCT Engineer's section in particular, are not staffed with sufficient personnel, or with the right collective expertise, to conduct a holistic analysis of the C-IED environment. When deployed, the BCT Engineer quickly becomes consumed responsibilities specific to general engineering activities, which generally involves extensive external coordination.⁶⁰ When this occurs, the BCT Engineer usually further delegates responsibility for synchronizing C-IED activities to the junior officer assigned to the BCT Engineer section who has usually had recent firsthand experience with C-IED operations, often having already served a platoon leader.

⁵⁸Department of Defense, Joint IED Defeat Organization, *Providing Capabilities to the Warfighter*, <https://www.jieddo.mil/accomp.aspx> (accessed 2 May 2013).

⁵⁹Bennett, *Mission Command and The C-IED Fight: A Brigade Combat Team Analysis*.

⁶⁰Joint Readiness Training Center Observer Controller/Trainer Mentors. Collective observations over 36 separate BCT rotations.

When this occurs, the BCT Engineer's role, and by default the BCT S-3's role in synchronizing the C-IED fight becomes relegated to publishing the RCP schedules and ensuring that RCP assets are available to support specific battalion level operations. Consequently, this approach to synchronization fails to adequately integrate the multitude of threat specific ISR assets, enemy TTPs, and the previously mentioned synergistic effect. This, understandably, is an unintended consequence of not having sufficient personnel, with the right collection of expertise, dedicated to a single aspect of the environment and perpetuates a reactive approach to C-IED operations. When this occurs, BCTs are denied the opportunity to achieve the offensive momentum achievable through a dedicated approach to IED analysis and synchronization.⁶¹

BSTB Centric Approach

Some BCTs recognize the inherent C-IED limitations within the BCT staff and assign primacy for the C-IED fight to their Brigade Special Troops Battalion (BSTB). This appears logical with the existing relationship the BSTB has with C-IED enablers. The BSTB is the parent headquarters for the BCT's organic C-IED enablers and is often administratively responsible for a multitude of non-organic C-IED enablers. Therefore, this is perceived as a natural mission for a BSTB to execute. Although this can achieve a positive effect, the usual challenge relates to a subordinate battalion being responsible for coordinating and synchronizing activities of higher headquarters and sister battalions within the BCT.

Under certain conditions this can be effective, although it is usually personality dependent and requires the BCT commander to deliberately direct C-IED roles, responsibilities, and authorities. For example the BCT Commander must clearly articulate to his staff and other battalions what authority the BSTB Commander has for coordinating activities. Although it can work, what sometimes happens is the BSTB conducts the analysis, and then creates friction and

⁶¹Ibid.

receives pushback, when trying to synchronize activities. It is natural for any battalion to resist direction when they perceive the brigade staff is asking them to conduct activities, they believe were conceived by a sister battalion, and which may run contrary to the tasked battalion's priorities and desires.⁶²

The Targeting Process

Many BCTs attempt to overcome the compartmentalization of information through their targeting process. Routinely, BCTs deploying to Afghanistan or Iraq utilize a multi-week targeting process. BCTs conducting Counter-Insurgency Operations generally do not conduct targeting operations at the same frequency as would be optimal for combined arms maneuver type operations. The common targeting process includes members from the various staff sections meeting in multiple working groups relevant to the BCTs long term objectives. These working groups often relate to some variation or deviation of the Political, Military, Economic, Social, Infrastructure, Information (PMESII-PT) construct. The purpose is to identify activities which will advance or contribute to the advancement of local conditions. These activities are usually not time sensitive and may require weeks or months to execute. Once initial working groups have met, and often a week later, synchronization meetings occur to coordinate and allocate required resources and specific tasks. The goal of the synchronization meeting is to ensure all required assets and activities are in the right time and place to achieve the desired effect.⁶³

Ideally, this is where the intelligence section would fuse IED specific intelligence and synchronize ISR and other S-3 type C-IED activities. Many BCTs attempt to nest their C-IED activities into the previously described targeting process. While this type of targeting process is entirely adequate for the wide area security type missions, where it is understood that permanent

⁶²Joint Readiness Training Center Observer Controller/Trainer Mentors.

⁶³Ibid.

effects take time to achieve, it is not sufficiently responsive for synchronizing C-IED activities. The multi-week approach carries the risk that a BCT may focus on solutions to enemy tactics, techniques, and procedures that have already evolved and are no longer relevant. The BCT thereby remains reactive to the IED threat.

The IED environments experienced in Afghanistan and Iraq, and the ones the U.S. military should anticipate in future conflicts, are dynamic.⁶⁴ Every single day, threat tactics evolve, relevant intelligence is collected, and BCT personnel conduct operations in close proximity to the threat. In order to maximize effectiveness a BCT requires responsive processes for analyzing and disseminating intelligence and synchronizing activities. The tempo of the IED environment is rapid with the enemy quickly adapting to and capitalizing on recognized vulnerabilities. To remain offensive BCTs must be able to rapidly adjust their C-IED posture. This responsiveness is difficult to achieve when BCTs rely on C-IED and synchronization working groups based on a multi-week targeting process as their primary collaboration venue.

C-IED FUSION CELLS

The persistent challenges associated with the complex, sophisticated, and lethal IED environment necessitates a modernized approach. The manner in which the enemy can construct, place, and detonate an IED is limited only by their imagination. IEDs can effectively target individuals, armored formations, and infrastructure and attacks can be executed by either a single individual or an entire network. To operate effectively, BCTs require proven solutions, specific to the unique and complex challenges associated with the IED environment. The creation of a BCT C-IED Fusion Cell, with specific capabilities, is the most efficient manner for a BCT to counter the complexities of the IED environment and address the current manning shortcomings within the BCT headquarters specific to the C-IED fight. The creation of a C-IED Fusion Cell within the

⁶⁴Ibid.

BCT Headquarters will provide the BCT Commander and subordinate organizations the capability to better analyze, integrate, and disseminate C-IED intelligence and more effectively synchronize C-IED assets, capabilities, and operations. This addition will not only significantly contribute to the increased survivability of BCT soldiers but also enhances network targeting activities and overall mission accomplishment. Fusion Cells, and C-IED Fusion Cells in particular, are a proven solution. They have been tested and validated in combat during OIF and OEF. Furthermore, the defense establishment, through multiple doctrinal publications has recognized the value of C-IED Fusion Cells and the merit of placing them within war-fighting formations.

A BCT who utilizes a select and dedicated group of individuals singularly charged with the frequent analysis and synchronization of C-IED information and activities is better positioned to be more offensive in the IED environment. A focused group, meeting every couple days, to develop or re-validate a complete understanding of the IED threat while simultaneously developing and coordinating activities to help mitigate the hazard, is proven to be a more effective way to stay ahead of the enemy's adaptation cycle.⁶⁵ The technical nuances associated with the IED environment, combined with the diverse methods of device employment, make this allocation an especially challenging task. Neither IEDs nor C-IED capabilities are one size fits all. Capabilities should be aligned in time and space with a specific type device, network, and TTP. This requires specific expertise and dedicated analysis. When done correctly, this approach enables rapid and effective targeting of enemy personnel and devices while significantly increasing survivability of friendly forces. Consistent and thorough analysis of forensic data fused with additional intelligence inputs can provide revealing information about an enemy network's

⁶⁵Benjamin Bennett, "Mission Command and the Counter-IED Fight: A Brigade Combat Team Analysis," *Engineer* (Jul/Aug 2013).

system of support, resource requirements, locations and activities.⁶⁶ A BCT C-IED Fusion Cell is an efficient manner in which to provide this capability.

Example of Fusion Cell Success

To avoid defeat, military formations require agile responses to negate the disadvantage imposed by a new threat or capability.⁶⁷ The constant focus provided by a Fusion Cell positions an organization to better understand and anticipate threat activity. Fusion Cells are not a new development; the attacks of 11 September 2001 necessitated a new approach for analyzing and sharing intelligence and synchronizing counter-terrorism activities. In the paper *What Makes Fusion Cells Effective*, the authors compared and contrasted numerous U.S. Government Counter-Terrorism Fusion Cells to identify what made some more successful than others.⁶⁸ The explicit and unequivocal results of the study provides direct proof that Fusion Cells are effective at integrating vast amounts of information and complex data from multiple sources and are capable of synthesizing this information into actionable information. From this synthesis of information comes a more precise and efficient coordination of activities. This study establishes the usefulness of Fusion Cells and provides insight on how to make them more effective.⁶⁹

Much has been published about the use of Fusion Cells in the Special Operations community in Iraq and Afghanistan.⁷⁰ Many attribute the success of General Stanley McChrystal, and his Special Operations Task Force, to the development and effective employment of Fusion

⁶⁶Joint Readiness Training Center Observer Controller/Trainer Mentors.

⁶⁷Smith, 1.

⁶⁸Christopher Fussell, Trevor Hough and Matthew Pedersen, “What Makes Fusion Cells Effective,” (Master’s thesis, Naval Postgraduate School, Monterey, CA).

⁶⁹Ibid.

⁷⁰The Defense Technology Information Center (DTIC) database maintains a collection of military affiliated and related articles, thesis, and essays. A general key word search of Special Operations and Fusion Cells in Iraq and Afghanistan produced over 1000 results.

Cells.⁷¹ General McChrystal implemented a Fusion Cell construct within the Special Operations formation he commanded in Iraq and also in Afghanistan when he was the theater commander. In his book *My Share of the Task*, General McChrystal credits the Fusion Cell construct with contributing to the rapid synthesis of valuable intelligence combined with effective synchronization of multiple and simultaneous operations throughout all of Iraq.⁷²

The efficiency with which General McChrystal's formation was able to capitalize on the advantages of Fusion Cell activities is apparent in the metric of raids conducted per night. In the early phases of OIF Special Operations forces would conduct one or two raids per night. When operating at full capacity and peak efficiency, General McChrystal's formation could execute multiple raids per night, simultaneously capturing as many as 10-20 "High Value Targets" in a single evening.⁷³ The speed and precision associated with these operations was supported by the headquarters' ability to rapidly identify timely, accurate, and reliable intelligence, synthesize its relevance, and disseminate it across the formation so it could be actioned before the utility of the information had expired.⁷⁴ This fusion of information and synchronization of activities was enabled through the creation of a Fusion Cell.

There are many different units, personnel, and pieces of equipment assigned to Iraq in support of Operation Iraqi Freedom. There is one unique organization designed to bring them all together in order to defeat and drive out the al Qaida presence in Iraq—that organization is known as the Fusion Cell. Set up to bring intelligence and operational resources together in one room in order to carry out timely and accurate terrorist interdiction in Iraq, the Fusion Cell is a revolutionary way of fighting a modern day

⁷¹Peter Goodspeed, "U.S. 'black ops' Key to Revamped Afghan Strategy," *National Post* (20 May 2009): A.12.

⁷²Stanley McChrystal, *My Share of the Task* (Penguin Books Ltd, 2013).

⁷³McChrystal; Joby Warrick and Robin Wright, "U.S. Teams Weaken Insurgency In Iraq," *Washington Post*, 6 September 2008, http://articles.washingtonpost.com/2008-09-06/world/36869600_1_salim-abdallah-ashur-abu-uthman-iraqi-insurgents (accessed 28 July 2013).

⁷⁴McChrystal.

war....Fusion Cells will be able to effectively identify, find and eliminate terrorist activity before devastation and destruction can occur.⁷⁵

General McChrystal replicated this process when he assumed command in Afghanistan.

Immediately upon assuming command of the International Security and Assistance Force (ISAF)

General McChrystal “initiated a top down review of the coalition force, its strategy, how it

functioned, and what needed to change in order to stem the insurgent advance and seize the

initiative.”⁷⁶ During this process a small team analyzed how to better structure the staff to

improve their ability rapidly gather, process, and disseminate critical information, and plan and

execute activities in a manner which would allow coalition forces to gain and maintain the

initiative. The output of this staff analysis was the development of a “Cross-Functional Team

Staff Structure.” This Fusion Cell construct enabled the headquarters to “communicate and share

information internally and with higher and lower echelons more quickly and accurately... and

created shared situational understanding and institutional knowledge...thus accelerating the

planning process while improving the quality of the product.”⁷⁷ This approach serves as an

efficient way to organize the staff when a command needs to flatten communication, increase

situational understanding, and enable a rapid and informed decision making.⁷⁸

In a paper titled “Integrating Intelligence and Information: “Ten Points for the Commander,” two of General McChrystal’s top advisors provide ten points to commanders operating on complex battlefields. Among others, these recommendations include: building Fusion Cells, learning and integrating ISR capabilities and intelligence, create context and

⁷⁵Eric Hillard, “The Brain that Harnesses the Brawn of the War in Iraq,” *Pacific Air Forces Public Affairs*, 12 July 2006, <http://www.pacaf.af.mil/news/story.asp?id=123034479> (accessed 28 July 2013).

⁷⁶Wayne W. Grigsby and Mark E. Johnson, “Cross-Functional Team Staff Structure in the Afghanistan Insurgency,” *Army* (June 2012): 35.

⁷⁷Ibid., 35, 36.

⁷⁸Ibid., 36.

synchronize activities.⁷⁹ In their paper they emphatically recommend the creation of Fusion Cells within organization attempting to effectively integrate intelligence and synchronize operational activities against multifaceted enemies operating on complicated environments.

Organizations called fusion cells built in Iraq and later in Afghanistan should be a focal point for integrating intelligence and information in the future. An environment where the volume and velocity of information from so many different sources forced organizations such as the brigade combat teams and below to collect and analyze data. This makes the development of these fusion cells a critical requirement. Fusion is about focusing our intelligence and information collections systems, and about the speed of responding to the task, precision in addressing the problem and with the best available capability, and understanding what the expected outcomes should be. This element must be able to communicate rapidly up, down, and laterally across organizations without restrictions (flattening networks).⁸⁰

Much like a BCT Fires Cell has the responsibility to conduct fires specific intelligence analysis, planning, integration and synchronize of fires activities, a C-IED Fusion Cell is essential to ensuring full integration and synchronization of all BCT C-IED activities. A BCT possesses a Fires Cell because of the complex, sophisticated, and lethal nature of the fire support mission and to facilitate targeting. Fires cells have been placed in BCTs because they are considered necessary for success in the artillery fight. This logic is appropriate and applicable to the C-IED environment. This is especially true since the IED has been often categorized as the “artillery of the 21st century” and the “focal point of any future conflict.”⁸¹

Many BCTs have employed a C-IED Fusion Cells while deployed in Afghanistan and Iraq. An example of the success which can be achieved through the employment of a C-IED Fusion Cell concept, and further proof of the validity of this model, can be seen from analysis of BCTs activities against active IED threats in combat. The 1st Brigade Combat Team of the 82nd

⁷⁹ Michael T. Flynn and Charles A. Flynn, “Integrating Intelligence and Information: Ten Points for the Commander,” *Military Review* 92 (January–February 2012): 4, 5.

⁸⁰ *Ibid.*, 4.

⁸¹ Richard De Silva, “IEDs: The Artillery of the 21st Century,” *Defence IQ* (2012): 1, <http://www.defenceiq.com/army-and-land-forces/articles/ieds-the-artillery-of-the-21st-century> (accessed 20 April 2013).

Airborne Division (TF 1-82) created a C-IED Fusion Cell during their 2012 deployment to Afghanistan. During their deployment TF 1-82 employed a dedicated eight man C-IED Fusion Cell. “Despite (TF 1-82) experiencing a documented 197 percent increase in IED activity from the previous year, all measures of merit used by DOD agencies to evaluate effectiveness was significantly improved. Notable were significant increases in found and clear rates and decreases in enemy effectiveness and friendly casualties sustained per attack.”⁸²

Doctrinal Recognition of C-IED Fusion Cell Requirements

Recent U.S. military doctrinal publications recognize the extreme complexity of the IED environment and the merit of establishing dedicated elements within organizations specifically focused on the integration of C-IED information and activities. A number of publications recognize the importance of creating a C-IED Fusion Cell structure within organizations, at multiple echelons of command, to synthesize and synchronize C-IED intelligence and operations.⁸³ These include the DOD’s overarching Counter-IED doctrinal publication, Joint Publication (JP) 3-15.1 *Counter-Improvised Explosive Device Operations* which was published in 2012, the 2011 United States Joint Forces Command *Commander’s Handbook for Attack the Network*, the 2011 publication of FM 3-34 *Engineer Operations*, and the 2013 United States Marine Corps Interim Publication (MCIP) 3-17.02 MAGTAF *Counter-Improvised Explosive Device Operations*. These publications formally recognize that “neutralizing threat networks is not an easy task and requires an intense intelligence collection effort, patience, and an integrated, synchronized and cooperative effort...the most common technique for promoting necessary

⁸²Benjamin Bennett, “Mission Command and the Counter-IED Fight,” 46.

⁸³Department of Defense, Joint Publication (JP) 3-15.1, *Counter Improvised Explosive Device Operations* (Washington, DC: Government Printing Office, 9 January 2012); Department of Defense, *Commander’s Handbook for Attack the Network*, 1.0, 20 May 2011, http://www.dtic.mil/doctrine/doctrine/jwfc/ann_hbk.pdf (accessed 28 July 2013).

cross-functional collaboration is through the formation of centers, groups, bureaus, cells...and other enduring and temporary organizations that manage specific processes and accomplish specific tasks.”⁸⁴

As described in doctrine, and discussed previously, the DOD has addressed this requirement at the theater and division level through the creation and employment of specific C-IED Task Forces. Theater and division level C-IED Task Forces such as CJTF Troy and CJTF Paladin (employed in OIF and OEF respectively) are singularly focused specialty organizations created to assist in the execution of the C-IED fight. These elements assist theater and division headquarters with the integration of tactical and operational level C-IED information and activities.⁸⁵

An additional capability also formally recognized in doctrine and one specifically designed to focus on the mitigation of explosive threats, is the Explosive Hazard Coordination Cell (EHCC). Used extensively in OIF, this theater level staff augmentation cell assists theater level headquarters with collection, analysis, and dissemination of explosive hazard information.⁸⁶ The EHCC provides capability by assisting in the development of operational understanding of explosive threat and assists in the tracking, predication, and distribution of explosive hazard related information. It provides technical and tactical training through the use of training teams and manage the acquisition, distribution, and effectiveness of specialized route clearance assets.

⁸⁴Department of Defense, *Commander’s Handbook for Attack the Network*, 1.0, 20 May 2011, http://www.dtic.mil/doctrine/doctrine/jwfc/ann_hbk.pdf (accessed 28 July 2013), ii, v-1.

⁸⁵Clark, 2,7.

⁸⁶Department of the Army, FM 3-34, *Engineer Operations* (Washington, DC: Government Printing Office, 2011), B-17.

Although initially designed to address conventional mine threats and explosive remnants of conflict, in OIF they were employed in a C-IED capacity.⁸⁷

Additionally, at the Joint Task Force level, DOD doctrine specifically recommends the creation of a J3 C-IED Operations Intelligence Fusion Cell whenever there is an active IED threat. The “C-IED operations and intelligence fusion cell is the operation’s sections focal point to coordinate and synchronize all IED related matters.”⁸⁸ The C-IED Operations Intelligence Fusion Cell is single entity responsible for friendly and enemy tactics tracking, development of training packages, prioritizes targeting activities, fusing intelligence and information, development and analysis of analytical products, and ISR management.⁸⁹

This type of capability is needed at multiple echelons of command and is not limited theater and division level headquarters. The complexities associated with IED environment and the struggle to effectively synthesize and synchronize information and activities also exists at the BCT level. This reality, and associated requirement, is recognized in the United States Marine Corps Interim Publication (MCIP) 3-17.02 MAGTAF *Counter-Improvised Explosive Device Operations*. Published in 2013, The Marine Corps C-IED manual formally recognizes the need for C-IED Fusion Cells within maneuver units and specifically addresses the requirement within the Marine Air Ground Task Force.

Implementation Considerations and Recommendations

There are multiple models which can serve as examples of an effective composition of a BCT C-IED Fusion Cell. To avoid existing short comings inherent within the current BCT

⁸⁷Douglas T. Adair, *The Explosive Hazards Coordination Cell (EHCC) in Operation Iraqi Freedom 2005-2007*, United States Army Sergeants Major Non Resident Course Class 33. 11 June 2007.

⁸⁸Department of Defense, JP 3-15.1, v-8.

⁸⁹Ibid.

structure, the C-IED Fusion Cell must be manned with a sufficient number of personnel, with the right seniority and expertise, to analyze the problem holistically and perform all functions associated with C-IED intelligence integration and asset synchronization. An effective C-IED Fusion Cell should have an adequate mix of personnel with intelligence and operational experience, capable of fusing all source intelligence, integrating the technical nuances associated with the IED threat, while simultaneously appreciating operational considerations and associated with both friendly and enemy activities. Moreover, a mixture of officers and non-commissioned officers is considered essential to ensuring diverse perspectives. Additionally, to be effective the leadership of the cell must have enough seniority to effectively integrate with higher headquarters, subordinate battalions, and other staff elements.

Special attention must also be given to determining the correct command support relationship between the C-IED Fusion Cell and other elements within the BCT. Creating an independent cell, with an independent charter, not nested under an existing staff section, will enhance organizational responsiveness, increase accountability, and contribute to the cross collaboration vital to successful C-IED operations. An independent section with specific responsibilities, reporting directly to the BCT Chief of Staff, will provide the C-IED Fusion Cell the flexibility to focus on the most critical aspects of the IED environment. This approach will contribute to a more holistic analysis of the environment, complete dissemination of information, and thorough synchronization of activities.

It is recognized that issues relating to the addition of personnel within any Army organization are extremely complex and the implementation of any change to a Table of Organization and Equipment (TOE) is extremely arduous.⁹⁰ It is also understood that the Army

⁹⁰Department of the Army, Army Regulation (AR) 71-32, *Force Development and Documentation*, July 2013, http://www.apd.army.mil/pdffiles/r71_32.pdf, (accessed 27 September 2013); Department of the Army, Army Regulation (AR) 570-4, *Manpower*

operates under a congressionally mandated end-strength and that additions of personnel in one organization must equate to a loss of personnel in other formations.⁹¹ Stated another way, the addition of capability in one formation must equate to a loss of capability in another formation; when personnel movements are complete no increase in overall end-strength is authorized. Therefore, the consequences of any decision specific to the addition of personnel must be evaluated holistically, with careful consideration paid to risk of the entire force. Generally speaking, there are two approaches which can be used to implement the concepts described herein. These approaches are described below under the context of a permanent approach and temporary approach.

Establishing a fully manned and capable C-IED Fusion Cell within every BCT in a permanent capacity, is the preferred approach to implementation. Establishing BCT C-IED Fusion Cells as an authorized and required capability, on a permanent basis, will allow the C-IED Fusion Cell the opportunity to refine systems, develop TTPs, identify strengths and weakness, adjust to personalities within the BCT, and to develop subject matter expertise within the IED threat domain. The permanency of this addition will reduce risk as elements within the BCT will be accustomed to integrating with an element of the headquarters responsible for mitigating the most lethal aspect of the operating environment. Furthermore, as the time and resources required to form, train, and integrate a C-IED Fusion Cell prior to deployment will be reduced, overall readiness of the BCT will be increased.

Management, 8 February 2006, www.apd.army.mil/pdffiles/r570_4.pdf, (accessed 27 September 2013).

⁹¹Lieutenant General Howard B. Bromberg, Lieutenant General Darrell D. Jones, USAF, Lieutenant General Robert E. Milstead, Jr., USMC, Vice Admiral Scott R. Van Buskirk, Mrs. Jessica L. Wright, “Impact to Military end Strength in a Budget Constrained Environment,” United States House of Representatives Committee on Armed Services, Subcommittee on Military Personnel One Hundred Thirteenth Congress, First Session (27 February 2013): 6, <https://www.hSDL.org/?view&did=732399m>, (accessed 29 September 13).

Implementation of this recommendation would only require the reallocation of a few companies worth of personnel. For purposes of discussion, manning each of the planned 32 BCTs in the Army with a ten personnel C-IED Fusion Cell would require the re-distribution of 320 personnel. The re-allocation of 320 positions, identified as excess capacity, within a 490,000 soldier active force equates to a minute overall percentage of the force affected.⁹² This equates to approximately two companies worth of personnel being re-invested and a net growth of only ten personnel to an existing 4,500 soldier BCT.⁹³ The potential return on this investment will be measured in IED discovered, insurgents and networks neutralized, and an overall reduction in American casualties.

If it is determined that establishing a permanent C-IED Fusion Cell within each BCT is not feasible, a second albeit less optimal solution, is to create temporary C-IED Fusion Cells within each BCT. This can be accomplished through implementation of a “required” but “not authorized” structuring of the TOE.⁹⁴ In this capacity, the C-IED Fusion Cell would be a formally recognized as a requirement within the BCT headquarters, with place holders for specific personnel, which would only be filled when a BCT receives deployment orders. Although this

⁹²Todd Lopez, “Combat Teams Cut at 10 Posts Will Help other BCTs Grow,” (25 June 2013), http://www.army.mil/article/106373/Brigade_Combat_Team_cut_at_10_Posts_will_help_other_BCTs_grow/, (accessed 27 September 13); A 320 Personnel Fusion Cell divided by a 490,000 Active Component Army equates to a redistribution of 6.54×10^{-4} or (six ten thousandths of one percent) of the force.

⁹³Todd Lopez; Michael Moran, “Modern Military Force Structures,” *Council on Foreign Relations*, (26 October 2006): 30, <http://www.cfr.org/world/modern-military-force-structures/p11819> (accessed 29 September 2013). “A company sized unit consists of approximately 130 to 150 soldiers and are normally commanded by captains. They consist of four platoons, usually of the same type, a headquarters unit, and some logistical capabilities. Companies are the basic elements of all battalions.”

⁹⁴Department of the Army. Army Regulation (AR) 570-4, *Manpower Management*, (8 February 2006): 91 and 94, www.apd.army.mil/pdffiles/r570_4.pdf. (accessed 27 September 2013). Required is defined as “the minimum number of military and civilian personnel which an Army unit or activity requires to perform its mission effectively” and “Authorized is defined as the portion of required manpower that: a) can be supported by allocated manpower or b) is reflected in the authorized columns of current or projected authorization documents.”

solution would deny the BCT the opportunity to train together on a repetitive basis and refine processes and systems, it would ensure that the BCT have the capability when most needed. The “required” but “not authorized” temporary approach would allow the Army to provide a C-IED Fusion Cell capability to a BCT only when required without the burden of permanently restructuring the entire force and without permanently reducing capabilities in other areas.

CONCLUSION

America’s involvement with the IED in Iraq and Afghanistan has resulted in the death and injury of over 36,000 American servicemen and women. Despite \$58 billion investments in technology and significant adjustments within the military’s fighting formations, the IED remains a major threat to military personnel and American citizens, and continues to prove capable of threatening military and national objectives. IED activity around the world continues to increase and further validate predictions by senior officials within government that America should anticipate continued exposure to the IED. The American Army should expect future enemies to employ the IED as a significant weapon in any future conflict.⁹⁵

Industry, academia, and the military have accomplished much and have achieved many successes mitigating the effects of the IED. Significant progress has been made in the IED threat domain and American service members are better prepared today to survive a blast, defeat networks, and mitigate the devastating effect of an IED today than they were a decade ago. Although much has been accomplished, the IED’s enduring distinction of being the highest casualty producing weapon in America’s decade long conflicts in Iraq and Afghanistan, combined with its continued global proliferation, indicate there is still significant room for improvement.

⁹⁵ Barbero, “War Against Terrorists’ IED Will Be With Us Forever,” 1; U.S. Government Accountability Office, 1.

Analysis of the U.S. Army's recent exposure to the IED during operations in Afghanistan and Iraq and the associated evolutions in capability indicate that an opportunity exists to improve the BCT's ability to mitigate the IED threat. Within the Army, organizational adjustments to the modular war fighting formation, the BCT, combined with continued formalization of specific C-IED capabilities will better prepare units for operations in high threat IED environments. The creation of an independent and organic BCT Counter-IED Fusion Cell, singularly responsible for the integration and synchronization of all C-IED initiatives will drastically improve the effectiveness of C-IED operations within the BCT. Investigation of the common approaches used by BCTs to address the IED threat, and their associated limitations, highlight the complexities of the IED environment and demonstrate the need for a dedicated C-IED element within the BCT headquarters. Fusion Cells have proven to contribute to the more thorough analysis and increased dissemination of information among organizations, and improve the synchronization of activities in combat. Fusion Cells have been repeatedly employed with great success and provide support to the doctrinal recognition of merit associated with placing C-IED Fusion Cells in organizations operating in high intensity IED environments.

Implementation of C-IED Fusion Cells within each BCT requires the redistributing a few hundred positions identified as redundant capacity from within the army. Permanently reallocating this capacity to each BCT will impact a minor overall percentage of the active force and equates to a minimum addition of total personnel within each BCT. However, this addition of capability will significantly increase the BCT's ability to mitigate IED threats.

It is recommended that those organizations within the Army responsible for implementing such changes determine the precise number of personnel and most advantageous combination of experience, expertise, and seniority required for the C-IED Fusion Cell. This analysis should focus on the requirement to perform the functions associated with the complete top, down, and horizontal, analysis and integration of C-IED intelligence and thorough

synchronization of C-IED assets and activities. Once the composition and disposition of the C-IED Fusion Cell is complete, a feasibility analysis is required to determine which approach to providing this capability most effectively balances risk to the entire Army. Determining whether the permanent addition of this capability or the temporary “required” but “not authorized” approach to implementation most effectively considers and best apportions risk across the entire force is of considerable importance. Once these determinations have been made conditions will be set for full implementation of the recommendations provided herein.

The complexity of the IED environment will increase in the future. Tactics used in IED attacks will continue to evolve as adversaries seek to overcome U.S. technological advancements. The U.S. Army cannot afford to risk being unprepared for the IED threat in future conflicts. Continued investments in cognitive capability within war fighting formations, singularly focused on the holistic defeat of the IED, will greatly enhance a unit’s ability to leverage scientific advancements and remain offensive rather than reactive, when operating in the IED threat domain. The Army must continue as directed to actively seek opportunities to improve methods, materials, organizations, and procedures, designed to help prevent and mitigate IED attacks.⁹⁶ The addition of a C-IED Fusion Cell within each BCT provides this opportunity.

⁹⁶ The White House. *Countering Improvised Explosive Devices* (Washington, DC: Government Printing Office, 2013).

BIBLIOGRAPHY

- Adair, Douglas T. *The Explosive Hazards Coordination Cell (EHCC) in Operation Iraqi Freedom 2005-2007*. United States Army Sergeants Major Non Resident Course Class 33, 11 June 2007.
- Adamson, William G. "An Asymmetric threat invokes strategic leader initiative: the Joint Improvised Explosive Device Defeat Organization." Seminar paper, The Industrial College of the Armed Forces National Defense University, Fort McNair, Washington, D.C. 2007.
- Atkinson, Rick. "Left of Boom," 4-Part Series. *Washington Post*, 30 September 2007, 1 October 2007, 2 October 2007, 3 October 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/09/29/AR2007092900751_pf (accessed 5 June 2013).
- Barbero, Michael D., LTG, Director of Joint IED Defeat Organization. "War Against Terrorists' IED Will Be With Us Forever." *Stars and Stripes*, 20 May 2013. <http://www.stripes.com/war-against-ieds-will-be-with-us-forever-1.221692> (accessed 30 May 2013).
- _____. Statement before the United States House of Representatives, 20 September 2012.
- Barnes, Julian E. "Remaking Afghan War: Behind the Scenes, a Top Aide Leads Charge on Intelligence Sharing." *Orlando Sentinel* (29 November 2009): 23.
- Bhattacharji, Preeti. "Liberation Tigers of Tamil Eelam (aka Tamil Tigers) (Sri Lanka, separatists)." *Council on Foreign Relations*, 20 May 2009. <http://www.cfr.org/separatist-terrorism/liberation-tigers-tamil-eelam-aka-tamil-tigers-sri-lanka-separatists/p9242> (accessed 6 Aug 2013).
- Bennett, Benjamin A. "Development of a Methodology for Evaluating and Anticipating Improvised Explosive Device Threat Activity Using a Fault Tree Based Process." Doctoral Dissertation, Clemson University, 2009.
- _____. "Mission Command and the Counter-IED Fight: A Brigade Combat Team Analysis." *Army Engineer* (Jul/Aug 2013): 46-53.
- Bennett, John. "Turning Point in Fight Against IEDs – U.S. Shifts Focus Toward Targeting Cells that Make Bombs." *Army Times*, 1 October 2007.
- Benson, Christopher. "Detecting Improvised Explosive Devices: Enduring Threat Requires Enduring Solutions." Strategy Research Project, U.S. Army War College, 2012.
- Bloom, Mia. "What the Tigers Taught Al-Qaeda." *Washington Post*, 24 May 2009. http://articles.washingtonpost.com/2009-05-24/opinions/36908404_1_female-suicide-bom (accessed 30 May 2013).
- Bokel, John. "IEDs in Asymmetric Warfare." *Military Technology* 31, no. 10 (October 2007): 34-45.
- Britt, Chris. "TRAINING THE CORPS: WIT-The Battlefield Commander's Force Multiplier in the CIED Fight." *Military Intelligence Professional Bulletin* 35 (April-June 2009): 51-55.
- Bromberg, Howard B., Lieutenant General, Lieutenant General Darrell D. Jones, USAF, Lieutenant General Robert E. Milstead, Jr., USMC, Vice Admiral Scott R. Van Buskirk, Mrs. Jessica L. Wright. "Impact to Military end Strength in a Budget Constrained Environment." United States House of Representatives Committee on Armed Services,

- Subcommittee on Military Personnel One Hundred Thirteenth Congress, First Session, 27 February 2013, <https://www.hndl.org/?view&did=732399> (accessed 29 September 13).
- Byford, George J. "COUNTER Improvised Explosive (C-IED) Operations as an Element of Counter Insurgency (COIN): Balancing C-IED Efforts to Support Commander International Security Assistance Force (COMISAF) Operational Objectives." Master's thesis, Naval War College, 2010.
- Clark, Vincent T. "The Future of JIEDDO – The Global C-IED Synchronizer." Special Report, Naval War College, 2008.
- Counter-IED Operations/Integration Center. "Joint IED Defeat Organization." <https://www.jieddo.mil/attack.aspx> (accessed 6 Aug 2013).
- Darnell, D. M. "The Marine Corps Needs a Targeting, Sensors, and Surveillance Systems Operational Integration and Support Team." Special Report, U.S. Marine Corps, Washington, DC, 2 March 2010.
- Davies, Roger. "Early Chinese Victim-Operated IEDs." Entry posted 10 June 2012, www.standingwellback.com/home/2012/6/10/early-chinese-victim-operated-ieds.html (accessed 30 May 2013).
- _____. "Historical Use of IEDs." Entry posted 5 September 2011, www.standingwellback.com/home/2011/9/5/historical-use-of-ieds.html (accessed 30 May 2013).
- De Silva, Richard. "IEDs: The Artillery of the 21st Century." *Defence IQ* (2012). <http://www.defenceiq.com/army-and-land-forces/articles/ieds-the-artillery-of-the-21st-century> (accessed 20 April 2013).
- Defense Systems Staff. "Better Sensors, Cameras Help US Thwart IEDs in Afghanistan." *Defense Systems* (17 Jul 2012).
- Department of the Army. Army Regulation (AR) 71-32. *Force Development and Documentation*, (1 Jul 2013). http://www.apd.army.mil/pdffiles/r71_32.pdf (accessed 27 September 2013).
- _____. Army Regulation (AR) 570-4, *Manpower Management*, (8 February 2006). www.apd.army.mil/pdffiles/r570_4.pdf (accessed 27 September 2013).
- _____. *2012 Army Strategic Planning Guidance*. Washington, DC: Government Printing Office, 2012.
- _____. FM 3-34, *Engineer Operations*. Washington, DC: Government Printing Office, 2011.
- _____. FM 3-90.6, *Brigade Combat Team*. Washington, DC: Government Printing Office, 2010.
- Department of Defense. Joint IED Defeat Organization. *Counter Improvised Explosive Device Strategic Plan 2012-2016*. Washington, DC: Government Printing Office, 2012.
- _____. Joint IED Defeat Organization. *Rapidly Providing Capabilities to the Warfighter*. <https://www.jieddo.mil/accompas.aspx> (accessed 2 May 2013).
- _____. Joint Publication 3-15.1, *Counter Improvised Explosive Device Operations*. Washington, DC: Government Printing Office, 9 January 2012.

- _____. *Commander's Handbook for Attack the Network, 1.0*. Joint Warfighting Center Joint Doctrine Support Division Suffolk, Virginia. 20 May 2011.
http://www.dtic.mil/doctrine/doctrine/jwfc/ann_hbk.pdf (accessed 28 July 2013).
- _____. Office of the Assistant Secretary of Defense (Public Affairs). News Release, No. 695-06. Washington: DC, 20 July 2006.
- _____. Office of the Under Secretary of Defense (Comptroller). Fiscal Year 2013 Budget Request. Washington: DC, 20 July 20013.
http://dcmo.defense.gov/publications/documents/FY2013_Budget_Request_Overview_Book.pdf (accessed 22 October 2013).
- Department of the Navy. *MAGTF Counter-Improvised Explosive Device Operations*. Washington, DC: Government Printing Office, 2002.
- Eisler, David. "Counter-IED Strategy in Modern War." *Military Review* (January-February 2012): 9-15.
- Flynn, Michael T. and Charles A. Flynn. "Integrating Intelligence and Information: Ten Points for the Commander." *Military Review* 92 (January-February 2012): 4-8.
- Fussell, Christopher, Trevor Hough and Matthew Pedersen. "What Makes Fusion Cells Effective." Master's thesis, Naval Postgraduate School, Monterey, CA.
- Goodspeed, Peter. "U.S. 'black ops' Key to Revamped Afghan Strategy." *National Post* (20 May 2009): A.12.
- Gourley, Scott. "AUVSI 2012: JIEDDO Outlines Unmanned Airborne Initiatives." *Counter-IED Report* (6 August 2012). www.counteriedreport.com/pressreleases/news-jieddo-outlines-unmanned-airborne-initiatives (accessed 2 May 2013).
- Grigsby, Wayne W. and Mark E. Johnson, "Cross-Functional Team Staff Structure in the Afghanistan Insurgency." *Army* (June 2012). http://www.usa.org/publications/armymagazine/archive/2012/06/Documents/Grigsby2_0612.pdf (accessed 28 July 2013).
- International Institute For Strategic Studies. "IEDs: The Home-Made Bombs that Changed Modern War." *Strategic Comments*, 24 (9 August 2012).
- Jacobus, Todd M. "Strategizing the Counter-IED Fight in Anbar Province." *Engineer* (September-December 2010): 13-19.
- Joint Readiness Training C-IED Lead Observer Controller/Trainer Mentors. Lieutenant Colonel Kevin S. Brown, Brigade Special Troop Battalion Lead Observer Controller/Trainor Mentor (telephone interview 15 August 2015) and MAJ Bynum, Marcus. Interview by author. Fort Leavenworth, Kansas. 25 April 2013. Senior Brigade Engineer Observer Controller/Trainer Mentor and C-IED Lead for the Brigade Mission Command Lead at the Joint Readiness Training Center. Combined they have observed and evaluated 36 Brigade Combat Teams and evaluated their C-IED techniques and procedures.
- Jolly, Craig. "EOD and Engineers 'Close the Gap.'" *Engineer* 35, no. 1 (January-March 2005): 40-45.
- Hillard, Eric. "The Brain that Harnesses the Brawn of the War in Iraq." *Pacific Air Forces Public Affairs*, 12 July 2006. <http://www.pacaf.af.mil/news/story.asp?id=123034479> (accessed 28 July 2013).
- Lake, Eli. "America's New Bomb Threat." *The Daily Beast*, 13 July 2012.

- Lemay, John. "The Role of Improvised Explosive Devices in Terrorism." *Security Weekly* (23 May 2013).
- Levine, Haninah. "Improvised Response; Combating IEDs Will Require an Agile Game of Action and Reaction." *Bulletin of Atomic Scientist* (July/Aug. 2006): 22-23.
- Lopez, Todd. "Brigade Combat Teams Cut at 10 Posts Will Help other BCTs Grow 25." (June 2013). http://www.army.mil/article/106373/Brigade_Combat_Team_cut_at_10_Posts_will_help_other_BCTs_grow/ (accessed 27 September 13).
- Lovelace, James J., and Joseph L. Votel. "The Asymmetric Warfare Group: Closing the Capability Gaps." *Army Magazine* (March 2004).
- Lum, Zachary. "Defeating IEDs from Above: US Air Force ISR/EW in Irregular Operations." *Journal of Electronic Defense* (September 2006): 39, 41-42, 44-45.
- Magness, Thomas H. "IED Defeat: Observations from the National Training Center." *Engineer* (January-March 2005): 28-31.
- _____. "The Silver Bullet – Preparing Organizations for Success in the Counter-IED Fight." Strategy Research Project, U.S. Army War College, 2007.
- Marine Corps News Release. Availability of Marine Corps Interim Publication (MCIP) 3-17.02 MAGTAF Counter-Improvised Explosive Device Operations. 26 January 2013. http://www.marines.mil/News/Messages/MessagesDisplay/tabid/13286/Article/111486/a_vailability-of-marine-corps-interim-publication-mcip-3-1702-magtf-counter-impr.aspx (accessed 28 July 2013).
- Martin, James Kennedy. "Dragon's Claws: The Improvised Explosive Device (IED) as a Weapon of Strategic Influence." Master's thesis, Naval Postgraduate School, 2009.
- McChrystal, Stanley. *My Share of the Task*. Penguin Books Ltd., 2013.
- Moran, Michael. "Modern Military Force Structures." *Council on Foreign Relations* (26 October 2006). <http://www.cfr.org/world/modern-military-force-structures/p11819> (accessed 29 September 2013).
- Muhl, Gerald M., Jr. "Defeating Improvised Explosive Devices (IED): Asymmetric Threats and Capability Gaps." Special Research Project, U.S. Army War College, 2011.
- Niebauer, Micah A. and Charles A. Flynn. "Special Weapons Exploitation Team: Filling a Technical Intelligence Gap." *Military Intelligence Professional Bulletin* 34 (July-September 2008): 19-24.
- O'Neill, Bard E. *Insurgency & Terrorism: From Revolution to Apocalypse*. Washington, DC: Potomac Books, 2005.
- Osborne, William V. and Matthew T. Kralovec. "Infantry Battalion Intelligence." *Marine Corps Gazette* 95 (July 2011): 75-79.
- Picket, Kate. "A Brief History of the Tamil Tigers." *Time World* (4 Jan 2009). <http://www.time.com/time/world/article/0,8599,1869501,00.html> (accessed 6 Aug 2013).
- Porter, Gareth. "How the U.S. Quietly Lost the IED War in Afghanistan." *Inter Press Service News Agency* (10 June 2013).
- Powledge, Timothy R. "Beating the IED Threat." *Marine Corps Gazette* 89, no. 5 (May 2005): 64-66.

- Pugliese, David. "Military Aims to Eliminate Taliban Bomb-Makers; 'Not a Bogeyman.'" *National Post* (20 May 2008): A.5.
- Riemer, Christopher. "The Organizational Implications of the U.S. Army's Increasing Demand for Explosive Ordnance Disposal Capabilities." Master's thesis, Command and General Staff College, 2008.
- Roscoe, Heath C. and Kenneth Dean Mitchell. "Assured Mobility in the Army's First Stryker Brigade. *Engineer* 34, no. 3 (July-September 2004): 4-8.
- Savre, Kent D. "The Improvised Explosive Device; A Tactical Weapon With Strategic Influence." Strategy Research Project, U.S. Army War College, 2008.
- Schleuning, Amber N. "Through Synchronization: Taking on the Counter-IED Fight." *Engineer* (July-September 2006): 17-18.
- Silva, Michael J. "IEDs: The Obstacle in the Path to Assured Mobility." *Engineer* 37, no.1 (January-March 2007): 14-15A.
- Singer, P. W. "The Evolution of the IED: Why Our Countermeasures Fail to Keep Up with the Growing Threat." *Armed Forces Journal* (February 2012). <http://wwwarmedforcesjournal.com/2012/01/8565673/> (accessed 30 May 2013).
- Sisemore, James D. "Does the SBCT Intelligence Structure Need a Dedicated ACE/Fusion Cell?" Master's thesis, Command and General Staff College, 2004.
- Smith, Andres. *Improvised Explosive Devices in Iraq, 2003-09: A Case of Operational Surprise and Institutional Response*. Strategic Studies Institute, U.S. Army War College, Carlisle, PA, 2011.
- Taber, R. *War of the Flea*. Virginia: Potomac Books Inc., 2002.
- Tan, Michelle. "Army Proposes Adding Engineers to Brigades". *Army Times*, 12 May 2012, <http://www.armytimes.com/article/20120512/NEWS/205120320/Army-proposes-adding-engineers-to-brigades> (accessed 29 October 13).
- The White House. *Countering Improvised Explosive Devices*. Washington, DC: Government Printing Office, 2013.
- "Thousands Run Final Mile of Boston Marathon". *USA Today*. 25 May 2013. <https://www.usatoday.com/story/sports/olympics/2013/05/25/thousands -run-final-mile-boston-marathon> (accessed 19 June 2013).
- U.S. Government Accountability Office. *Counter-Improvised Explosive Devices: Multiple DOD Organizations are Developing Numerous Initiatives*. Washington, DC: Government Printing Office, 2012.
- Vanden Brook, Tom. "IED Casualties Dropped 50% in Afghanistan in 2012." *USA Today*, 18 January 2013.
- Vane, Michael A. LTG and MG David E. Quantock. "Countering the Improvised Explosive Device Threat." *Army Magazine* 61, no. 3 (March 2011): 56-62.
- U.S. House of Representatives. Committee on Armed Services. *The Joint Improvised Explosive Device Defeat Organization: DOD's Fight Against IEDs Today and Tomorrow*. Washington, DC: Government Printing Office, 2008.
- Warrick, Joby and Robin Wright. "U.S. Teams Weaken Insurgency In Iraq." *Washington Post*, 6 September 2008. <http://articles.washingtonpost.com/2008-09>

06/world/36869600_1_salim-abdallah-ashur-abu-uthman-iraqi-insurgents (accessed 28 July 2013).

Wilson, Tom. *Improvised Explosive Devices in Iraq: Effects and Countermeasures*. CRS Report for Congress. Order Code RS223330, (2005). Washington, DC: Congressional Research Service.

Wood, Glenn. "Personal Experience Paper." United States Army Sergeants Major Academy, 21 September 2006.